Notice No.2

Rules and Regulations for the Classification of Inland Waterways Ships July 2017

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that Corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: December 2017

Amendments to	**Effective date**	**IACs/IMO implementation (if applicable)**
Part 1, Chapter 1, Sections 3 & 5	1 January 2018	N/A
Part 1, Chapter 2, Section 2	1 January 2018	N/A
Part 3, Chapter 5, Section 2	1 January 2018	N/A
Part 3, Chapter 9, Section 4	1 January 2018	N/A
Part 5, Chapter 1, Section 1	1 January 2018	N/A
Part 5, Chapter 10, Section 5	1 January 2018	N/A

Lloyd's Register

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Part 1, Chapter 1
General Regulations

■ *Section 3*
Technical Committee

3.1 ~~LR's Technical Committee is at present composed of a maximum of 80 members which includes:~~ LR maintains a Technical Committee, at present comprised of a maximum of 80 members, and additionally an Offshore Technical Committee with specific responsibility for LR's Rules for Offshore Units, at present comprised of a maximum of 80 members. Membership of the Technical Committees includes:

Ex officio members:

- Chairman and Chief Executive Officer of Lloyd's Register Group Limited
- Chairman of the Classification Committee of Lloyd's Register Group Limited

Members Nominated by:

- Technical Committee or Offshore Technical Committee
- Professional bodies representing technical disciplines relevant to the industry
- National and International trade associations with competence relevant to technical issues related to LR's business

3.2 In addition to the foregoing:

(a) Each National or Area Committee may appoint a representative to attend meetings of the Technical Committees.
(b) A maximum of five further representatives from National Administrations may be co-opted to serve on the Technical Committees. Representatives from National Administrations may also be elected as members of the Technical Committees as Nominated Members.
(c) Further persons may be co-opted to serve on the Technical Committees by the relevant Technical Committee.

3.3 All elections are subject to confirmation by the Board.

3.4 The function of the Technical Committees is to consider:

(a) any technical issues connected with LR's business;
(b) any proposed alterations in the existing Rules;
(c) any new Rules for classification;

Where changes to the Rules are necessitated by mandatory implementation of International Conventions and Codes, or Common Rules, Unified Requirements and Interpretations adopted by the International Association of Classification Societies, these may be implemented by LR without consideration by the relevant Technical Committee, although any such changes ~~will~~ may be provided to the Technical Committees for information.

Where changes to the Rules are required by LR to enable existing technical requirements within the Rules to be recognised as Class Notations or Descriptive Notes, these may be implemented by LR without consideration by the relevant Technical Committee, although any such changes will be provided to the relevant Technical Committee for information.

3.5 The term of office of the Chairman and of all members of ~~the~~ each Technical Committee is five years. Members may be re-elected to serve an additional term of office with the approval of the Board. The term of office of the Chairman may be extended with the approval of the Board.

3.6 In the case of continuous non-attendance of a member, the relevant Technical Committee may withdraw membership.

3.7 Meetings of the Technical Committees are convened as often and at such times and places as is necessary, but there is to be at least one meeting in each year. ~~Urgent matters~~ Matters may also be considered by the Technical Committees by correspondence.

3.8 Any proposal involving any alteration in, or addition to the General Regulations, of Rules for Classification is subject to approval of the Board. All other proposals for additions to or alterations to the Rules for Classification other than the General Regulations, will following consideration and approval by the relevant Technical Committee either at a meeting of ~~the~~ that Technical Committee or by correspondence, be recommended to the Board for adoption.

3.9 The Technical Committees ~~is~~ are empowered to:

(a) appoint sub-Committees or panels; and
(b) co-opt to the Technical Committee, or to its sub-Committees or panels, representatives of any organisation or industry or private individuals for the purpose of considering any particular problem.

■ *Section 5*
Applicability of Classification Rules and Disclosure of Information

5.1 LR has the power to adopt, and publish as deemed necessary, Rules relating to classification and has (in relation thereto) provided the following:

(a) Except in the case of a special directive by the Board, no new Regulation or alteration to any existing Regulation relating to classification or to class notations is to be applied to existing ships.

(b) Except in the case of a special directive by the Board, or where changes necessitated by mandatory implementation of International Conventions, Codes or Unified Requirements adopted by the International Association of Classification Societies are concerned, no new Rule or alteration in any existing Rule is to be applied compulsorily after the date on which the contract between the ship builder and shipowner for construction of the ship has been signed, nor within six months of its adoption. The date of 'contract for construction' of a ship is the date on which the contract to build the ship is signed between the prospective shipowner and the ship builder. This date and the construction number (i.e. hull numbers) of all the vessels included in the contract are to be declared by the party applying for the assignment of class to a newbuilding. The date of 'contract for construction' of a series of sister ships, including specified optional ships for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective shipowner and the ship builder. In this section a 'series of sister ships' is a series of ships built to the same approved plans for classification purposes, under a single contract for construction. The optional ships will be considered part of the same series of sister ships if the option is exercised not later than 1 year after the contract to build the series was signed. If a contract for construction is later amended to include additional ships or additional options, the date of 'contract for construction' for such ships is the date on which the amendment to the contract is signed between the prospective shipowner and the ship builder. The amendment to the contract is to be considered as a 'new contract'. If a contract for construction is amended to change the ship type, the date of 'contract for construction' of this modified vessel, or vessels, is the date on which the revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder. Where it is desired to use existing approved ship or machinery plans for a new contract, written application is to be made to LR. Sister ships may have minor design alterations provided that such alterations do not affect matters related to classification, or if the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the ship builder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to LR for approval. Recognising the long time period that may occur between the initial design contract and the contract for construction for offshore units for fixed locations, the date determining effective classification requirements will be specially considered by LR in such cases.

(c) All reports of survey are to be made by surveyors authorised by members of the LR Group to survey and report (hereinafter referred to as 'the Surveyors') according to the form prescribed, and submitted for the consideration of the Classification Committee.

(d) Information contained in the reports of classification and statutory surveys will be made available to the relevant owner, National Administration, Port State Administration, P&I Club, hull underwriter and, if authorised in writing by that owner, to any other person or organisation.

(e) Notwithstanding the general duty of confidentiality owed by LR to its client in accordance with the LR Rules, LR clients hereby accept that, LR will participate in the IACS Early Warning System which requires each IACS member to provide its fellow IACS members and Associates with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and utilised to facilitate the proper working of the IACS Early Warning System. LR will provide its client with written details of such information upon sending the same to IACS Members and Associates.

(f) Information relating to the status of classification and statutory surveys and suspensions/withdrawals of class together with any associated conditions of class will be made available as required by applicable legislation or court order.

(g) A Classification Executive consisting of senior members of LR's Classification Department staff shall carry out whatever duties that may be within the function of the Classification Committee that the Classification Committee assigns to it.

Part 1, Chapter 2
Classification Regulations

■ *Section 2*
Character of classification and class notations

2.5 Descriptive notes

2.5.2 **ShipRight()**. Where one or more of LR’s ShipRight procedures as detailed in the *Rules and Regulations for the Classification of Ships, Pt 1, Ch 2, Section 2.8.2* have been satisfactorily applied, then a descriptive note showing the associated characters of the procedure(s) within brackets will, at the Owner’s request, be entered in column 6 of the *Register Book*, preceded by the word **ShipRight**, e.g. **ShipRight(IHM, SERS)**.

Part 3, Chapter 5
Fore End and Aft End Structure

■ *Section 2*
Hull envelope plating

~~2.8 Crane pedestals~~

~~2.8.1 This section applies to pedestals for cranes and store cranes.~~

~~2.8.2 Pedestals, in general, are to be carried through the deck and satisfactorily scarfed into the hull or main support structure. Proposals for other support arrangements will be specially considered.~~

~~2.8.3 The pedestal flange in way of the slew ring bearing is to be designed and be of a thickness to provide a rigid and level support for the bearing and bolting. Tolerances and arrangements proposed by the slew ring manufacturer are to be adhered to.~~

~~2.8.4 Where it is considered necessary to introduce stiffening brackets to support the flange, the spacing of the brackets is to be not greater than that achieved by positioning them between every second bolt.~~

~~2.8.5 The pedestal is to be designed with respect to the worst combination of loads resulting from the crane self weight, live load and crane accelerations together with those resulting from the ship's heel and trim if anticipated to be greater than 5° and 2° respectively.~~

~~2.8.6 In the design of the pedestal, the following allowable stresses should not be exceeded:~~

~~Bending stress~~

$$\cancel{\sigma_b = 0.58\sigma_y}$$

~~Shear stress~~

$$\cancel{\tau = 0.34\sigma_y}$$

~~where~~

~~σ_y = yield stress of material, in N/mm^2~~

Part 3, Chapter 9
Special Features

■ *Section 4*
Lifting appliance support arrangements

4.1 Lifting appliance pedestals

4.1.1 Lifting appliance pedestals or foundations are to be designed with respect to the worst possible combinations of loads resulting from the crane self-weight, live load, wind and crane accelerations together with those resulting from the vessel's heel and trim.

4.1.2 Stowage arrangements are to be taken into account when calculating the loads to be applied to the pedestal.

4.1.3 When submitting plans for the proposed pedestal or foundation, the designer is to include design calculations covering the parameters indicated in *Pt 3, Ch 9, 4.1 Lifting appliance pedestals, 4.1.1 and Pt 3, Ch 9, 4.1 Lifting appliance pedestals, 4.1.4.*

4.1.4 The maximum permissible bending stress is given by:

$$\sigma_a = 0{,}58\sigma_o \text{ N/mm}^2$$

Where:

$\sigma_o =$ specified minimum yield stress in N/mm^2

4.1.5 The maximum permissible shear stress is given by:

$$\tau_a = 0{,}58\frac{\sigma_o}{\sqrt{3}} \text{ N/mm}^2$$

Where:

$\sigma_o =$ specified minimum yield stress in N/mm^2

4.2 Support structure for lifting appliance pedestals

4.2.1 Lifting appliance pedestals are to be efficiently supported and in general, are to be carried through the deck and satisfactorily scarfed into the surrounding structure. Alternatively, lifting appliance pedestals can comprise a foundation, in which case the foundation and its supporting structure are to be of substantial construction. Proposals for other support arrangements will be specially considered.

4.2.2 The deck plating and underdeck stiffening in way of a lifting appliance pedestal is to be assessed using the same criteria used to assess the lifting appliance pedestal.

4.2.3 Insert plates are to be incorporated in the deck plating in way of lifting appliance foundations. The thickness of the insert plates is to be as required by the designer’s calculations but in no case is to be taken as less than 1,5 times the thickness of the adjacent attached plating.

4.2.4 Where fitted, all inserts are to have well radiused corners and be suitably edge prepared prior to welding. The connection between the insert plate and the adjacent deck plating is to be full penetration. All other welding in way of the insert plate is generally to be double continuous and full penetration in way of critical locations. Tapers are to be not less than three to one.

Part 5, Chapter 1
General Requirements for the Design and Construction of Machinery

■ *Section 1*
General

1.4 ~~Departures~~ Deviations from the Rules

~~1.4.1 Where it is proposed to depart from the requirements of the Rules, the Committee will be prepared to give consideration to the circumstances of any special case.~~

~~1.4.2 Any novelty in the construction of the machinery, boilers or pressure vessels is to be reported to the Committee.~~

1.4.1 Any proposal to deviate from the requirements of the Rules will be specially considered.

Part 5, Chapter 10
Piping Design Requirements

■ *Section 5*
Plastic pipes

5.1 General

All content in this sub-Section has been deleted and replaced with the following.

5.1.1 Proposals to use plastic pipes in shipboard piping systems will be considered in relation to the properties of the materials, the operating conditions, the intended service and location. Details are to be submitted for approval. Special consideration will be given to any proposed service for plastic pipes not mentioned in these Rules.

5.1.2 Plastic pipes and fittings will, in general, be accepted in Class III piping systems. Proposals for the use of plastic in Class I and Class II piping systems will be specially considered.

5.1.3 For Class I, Class II and any Class III piping systems for which there are Rule requirements, the pipes are to be of a type which has been approved by LR.

5.1.4 For domestic and similar services where there are no Rule requirements, the pipes need not be of a type which has been approved by LR. However, the fire safety aspects, as referenced in *Pt 5, Ch 10, 5.4 Fire performance criteria* and *Pt 5, Ch 10, 5.5 Additional fire performance criteria applicable to inland waterways vessels*, are to be considered.

5.1.5 The use of plastic pipes may be restricted by statutory requirements of the National Authority of the country in which the vessel is to be registered.

5.2 Design and performance criteria

All content in this sub-Section has been deleted and replaced with the following.

5.2.1 Pipes and fittings are to be of robust construction and are to comply with an acceptable National or International standard, consistent with the intended use. Particulars of pipes, fittings and joints are to be submitted for consideration.

5.2.2 The design and performance criteria of all piping systems, independent of service or location, are to meet the requirements of *Pt 5, Ch 10, 5.3 Design strength.*

5.2.3 Depending on the service and location, the fire safety aspects, such as fire endurance, flame spread, smoke generation, toxicity and fire protection coatings, are to meet the requirements of *Pt 5, Ch 10, 5.4 Fire performance criteria* and *Pt 5, Ch 10, 5.5 Additional fire performance criteria applicable to inland waterways vessels*.

5.2.4 Plastic piping, connections and fittings are to be electrically conductive when:

(a) carrying fluids capable of generating electrostatic charges; or
(b) passing through hazardous zones and spaces, regardless of the fluid being conveyed.

Suitable precautions against the build-up of electrostatic charges are to be provided in accordance with the requirements of *Pt 5, Ch 10, 5.6 Electrical conductivity*.

5.3 Design strength

All content in this sub-Section has been deleted and replaced with the following.

5.3.1 The strength of pipes is to be determined by hydrostatic pressure tests to failure on representative sizes of pipe. The strength of fittings is to be not less than the strength of the pipes.

5.3.2 The nominal internal pressure, p_{Ni}, of the pipe is to be determined by the lesser of the following:

$$p_{\mathrm{Ni}} \le \frac{p_{\mathrm{st}}}{4}$$

$$p_{\mathrm{Ni}} \le \frac{p_{\mathrm{lt}}}{2{,}5}$$

where

p_{st} = short term hydrostatic test failure pressure, in bar

p_{lt} = long term hydrostatic test failure pressure (100 000 hours), in bar

Failure pressures obtained over a reduced period and extrapolated in accordance with a recognised National or International Standard will be specially considered.

5.3.3 In service, the pipe is not to be subjected to a pressure greater than p_{Ni}.

5.3.4 The nominal external pressure, p_{Ne}, of the pipe, defined as the maximum total of internal vacuum and external static pressure head to which the pipe may be subjected, is to be determined by the following:

$$p_{\mathrm{Ne}} \le \frac{p_{\mathrm{col}}}{3}$$

where

p_{col} = pipe collapse pressure, in bar

5.3.5 p_{col} is not to be less than 3 bar.

5.3.6 Piping is to meet the requirements of *Pt 5, Ch 12, 5.3 Design strength* over the range of service temperature which will experience.

5.3.7 High temperature limits and pressure reductions relative to nominal pressures are to be in accordance with a recognised standard, but in each case the maximum working temperature is to be at least 20°C lower than the minimum temperature for deflection under load of the resin or plastic material without reinforcement. The minimum heat distortion temperature is not to be less than 80°C. *See also Ch 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*.

5.3.8 Where it is proposed to use plastic piping in low temperature services, design strength testing is to be made at a temperature 10°C lower than the minimum working temperature.

5.3.9 The selection of plastic materials for piping is to take account of other factors such as impact resistance, ageing, fatigue, erosion resistance, fluid absorption and material compatibility such that the design strength of the piping is not reduced below that required by these Rules.

5.3.10 Design strength values may be verified experimentally or by a combination of testing and calculation methods.

5.4 Fire performance criteria

All content in this sub-Section has been deleted and replaced with the following.

5.4.1 Where a fire protective coating of pipes and fittings is necessary for achieving the fire endurance standards required, the coating is to be resistant to products likely to come into contact with the piping and be suitable for the intended application.

5.4.2 The materials used for plastic pipes, except those fitted on open decks and within tanks, cofferdams, void spaces, pipe tunnels and ducts are to have low flame spread characteristics.

5.4.3 The materials used for plastic pipes within accommodation, service and control spaces are not to be capable of producing excessive quantities of smoke and toxic products that may be a hazard to personnel within those spaces.

5.5 Additional fire performance criteria applicable to inland waterways vessels

5.5.1 Where plastic pipes are used in systems essential to the safe operation of the vessel, or for containing combustible liquids or sea water where leakage or failure could result in fire or in the flooding of watertight compartments, the pipes and fittings, including couplings with flexible internal seals, are to be of a type which has been fire endurance tested in accordance with the requirements of *Table 10.5.1 Fire endurance requirements.*

Table 10.5.1 Fire endurance requirements

		Location										
		A	B	C	D	E	F	G	H	I	J	K
CARGO (FLAMMABLE CARGOES (f.p. ≤ 55°C))												
1	Cargo lines	N/A	N/A	L1	N/A	N/A	0	N/A	0[10]	0	N/A	L1[2]
2	Crude oil washing lines	N/A	N/A	L1	N/A	N/A	0	N/A	0[10]	0	N/A	L1[2]
3	Vent lines	N/A	N/A	N/A	N/A	N/A	0	N/A	0[10]	0	N/A	X
INERT GAS												
4	Water seal effluent line	N/A	N/A	0[1]	N/A	N/A	0[1]	0[1]	0[1]	0[1]	N/A	0
5	Scrubber effluent line	0[1]	0[1]	N/A	N/A	N/A	N/A	N/A	0[1]	0[1]	N/A	0
6	Main line	0	0	L1	N/A	N/A	N/A	N/A	N/A	0	N/A	L1[6]
7	Distribution lines	N/A	N/A	L1	N/A	N/A	0	N/A	N/A	0	N/A	L1[2]
FLAMMABLE LIQUIDS (f.p. > 55°C)												
8	Cargo lines	X	X	L1	X	X	N/A[3]	0	0[10]	0	N/A	L1
9	Fuel oil	X	X	L1	X	X	N/A[3]	0	0	0	L1	L1
10	Lubricating oil	X	X	L1	X	X	N/A	N/A	N/A	0	L1	L1
11	Hydraulic oil	X	X	L1	X	X	0	0	0	0	L1	L1
OUTBOARD WATER[1]												
12	Bilge main and branches	L1[7]	L1[7]	L1	X	X	N/A	0	0	0	N/A	L1
13	Fire main and water spray	L1	L1	L1	X	N/A	N/A	N/A	0	0	X	L1
14	Foam system	L1	L1	L1	N/A	N/A	N/A	N/A	N/A	0	L1	L1
15	Sprinkler system	L1	L1	L3	N/A	N/A	N/A	N/A	0	0	L3	L3
16	Ballast	L3	L3	L3	L3	X	0[10]	0	0	0	L2	L2
17	Cooling water, essential services	L3	L3	N/A	N/A	N/A	N/A	N/A	0	0	N/A	L2
18	Tank cleaning services fixed machines	N/A	N/A	L3	N/A	N/A	0	N/A	0	0	N/A	L3[2]
19	Non-essential systems	0	0	0	0	0	N/A	0	0	0	0	0
FRESHWATER												
20	Cooling water essential services	L3	L3	N/A	N/A	N/A	N/A	0	0	0	L3	L3
21	Condensate return	L3	L3	L3	0	0	N/A	N/A	N/A	0	0	0
22	Non-essential systems	0	0	0	0	0	N/A	0	0	0	0	0
SANITARY/DRAINS/ SCUPPERS												
23	Deck drains (internal)	L1[4]	L1[4]	N/A	L1[4]	0	N/A	0	0	0	0	0
24	Sanitary drains (internal)	0	0	N/A	0	0	N/A	0	0	0	0	0
25	Scuppers and discharges (overboard)	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0[1,8]	0	0	0	0	0[1,8]	0
SOUNDING/AIR												
26	Water tanks/dry	0	0	0	0	0	0[10]	0	0	0	0	0[10]

	spaces											
27	OIL TANKS (f.p. > 55°C)	X	X	X	X	X	X[3]	0	0[10]	0	X	X
MISCELLANEOUS												
28	Control air	L1[5]	L1[5]	L1[5]	L1[5]	L1[5]	N/A	0	0	0	L[15]	L[15]
29	Service air (non-essential)	0	0	0	0	0	N/A	0	0	0	0	0
30	Brine	0	0	N/A	0	0	N/A	N/A	N/A	0	0	0
31	Auxiliary low pressure steam (≤ 7 bar)	L2	L2	0[9]	0[9]	0[9]	0	0	0	0	0[9]	0[9]

LOCATION DEFINITIONS

	Location	Definitions
A	Machinery spaces of Category A	Machinery spaces of Category A as defined in *SOLAS regulation II–2/3.19*.
B	Other machinery spaces and pump rooms	Spaces, other than Category A machinery spaces and cargo pump rooms, containing propulsion machinery, boilers, steam and internal combustion engines, generators and major electrical machinery, pumps, oil filling stations, refrigerating, stabilising, ventilation and air-conditioning machinery, and similar spaces, and trunks to such spaces.
C	Cargo pump rooms	Spaces containing cargo pumps and entrances and trunks to such spaces.
D	Ro-ro cargo holds	Ro-ro cargo holds are ro-ro cargo spaces and special category spaces as defined in *SOLAS regulation II–2/3.14* and *SOLAS regulation II–2/3.18*.
E	Other dry cargo holds	All spaces other than ro-ro cargo holds used for non-liquid cargo and trunks to such spaces.
F	Cargo tanks	All spaces used for liquid cargo and trunks to such spaces.
G	Fuel oil tanks	All spaces used for fuel oil (excluding cargo tanks) and trunks to such spaces. H Ballast water tanks
H	Ballast water tanks	All spaces used for ballast water and trunks to such spaces.
I	Cofferdams, voids, etc.	Cofferdams and voids are those empty spaces between two bulkheads separating two adjacent compartments.
J	Accommodation, service	Accommodation spaces, service spaces and control stations as defined in *SOLAS regulation II–2/3.10, SOLAS regulation II–2/3.12* and *SOLAS regulation II–2/3.22*.
K	Open decks	Open deck spaces, as defined in *SOLAS regulation II–2/9.2.2.3(5)*.

ABBREVIATIONS

L1	Fire endurance test in dry conditions, 60 minutes, IMO Resolution A.753(18) *Appendix 1 - Test Method for Fire Endurance Testing of Plastic Piping in the Dry Condition*.
L2	Fire endurance test in dry conditions, 30 minutes, IMO Resolution A.753(18) *Appendix 1 - Test Method for Fire Endurance Testing of Plastic Piping in the Dry Condition*.
L3	Fire endurance test in wet conditions, 30 minutes, IMO Resolution A.753(18) *Appendix 2 - Test Method for Fire Endurance Testing of Water-Filled Plastic Piping*.
0	No fire endurance test required.
N/A	Not applicable.
X	Metallic materials having a melting point greater than 925°C.

Note 1. Where non-metallic piping is used, remotely controlled valves are to be provided at vessel's side (valve is to be controlled from outside space).

Note 2. Remote closing valves are to be provided at the cargo tanks.

Note 3. When cargo tanks contain flammable liquids with f.p. > 55°C, '0' may replace 'N/A' or 'X'.

Note 4. For drains serving only the space concerned, '0' may replace 'L1'.

Note 5. When controlling functions are not required by the Rules or statutory requirements, '0' may replace 'L1'.

Note 6. For pipes between machinery space and deck water seal, '0' may replace 'L1'.

Note 7. For passenger vessels, 'X' is to replace 'L1'.

Note 8. Scuppers serving open decks should be 'X' throughout.

Note 9. For essential services, such as fuel oil tank heating and vessel's whistle, 'X' is to replace '0'.

Note 10. Air and sounding pipes on open deck are to be of substantial construction, *see also Pt 5, Ch 11, 10.2 Materials 10.2.1*.

~~5.5~~ 5.6 Electrical conductivity

All content in this sub-Section has been deleted and replaced with the following.

5.6.1 Where a piping system is required to be electrically conductive for the control of static electricity, the resistance per unit length of the pipe, bends, elbows, fabricated branch pieces, etc. is not to exceed 0,1 MΩ/m.

5.6.2 Where a piping system is required to be electrically conductive for the control of static electricity, electrical continuity is to be maintained across the joints and fittings and the system is to be earthed. The resistance to earth from any point in the piping system is not to exceed 1 MΩ. *See also Pt 6, Ch 2, 1.7 Earthing*.

~~5.6~~ 5.7 Manufacture and quality control

All content in this sub-Section has been deleted and replaced with the following.

5.7.1 All materials for plastic pipes and fittings are to be approved by LR, and are in general to be tested in accordance with C*h 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*. For pipes and fittings not employing hand lay up techniques, the hydrostatic pressure test required by *Ch 14, 4.9 Hydraulic test* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017* may be replaced by testing carried out in accordance with the requirements stipulated in a recognised National or International Standard, consistent with the intended use for which the pipe or fittings are manufactured, provided that there is an effective quality system in place complying with the requirements of *Ch 14, 4.4 Quality assurance* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017* and the testing is completed to the satisfaction of the LR Surveyor.

5.7.2 The material manufacturer's test certificate, based on actual tested data, is to be provided for each batch of material.

5.7.3 Plastic pipes and fittings are to be manufactured at a works approved by LR in accordance with agreed quality control procedures which shall be capable of detecting at any stage (e.g. incoming material, production, finished article, etc.) deviations in the material, product or process.

5.7.4 Plastic pipes are to be manufactured and tested in accordance with *Ch 14, 4 Plastic pipes and fittings* of the *Rules for the Manufacture, Testing and Certification of Materials, July 2017*. For Class III piping systems the pipe manufacturer's test certificate may be accepted in lieu of an LR Certificate and is to be provided for each consignment of pipe.

~~5.7~~ 5.8 ~~Installation and construction~~ Construction and installation

All content in this sub-Section has been deleted and replaced with the following.

5.8.1 All pipes are to be adequately but freely supported. Suitable provision is to be made for expansion and contraction to take place without unduly straining the pipes.

5.8.2 Pipes may be joined by mechanical couplings or by bonding methods such as welding, laminating and adhesive bonding.

5.8.3 Where bonding systems are used, the manufacturer or installer shall provide a written procedure covering all aspects of installation, including temperature and humidity conditions. The bonding procedure is to be approved by LR.

5.8.4 The person carrying out the bonding is to be qualified. Records are to be available to the Surveyor for each qualified person showing the bonding procedure and performance qualification, together with dates and results of the qualification testing.

5.8.5 Conditions during installation, such as temperature and humidity, which may affect the strength of the finished joints, are to be in accordance with the agreed bonding procedure.

5.8.6 The required fire endurance level of the pipe is to be maintained in way of pipe supports, joints and fittings, including those between plastic and metallic pipes.

5.8.7 Where piping systems are arranged to pass through watertight bulkheads or decks, provision is to be made for maintaining the integrity of the bulkhead or deck by means of metallic bulkhead, or deck pieces. The bulkhead pieces are to be of substantial construction and suitably protected against corrosion and so constructed to be of a strength equivalent to the intact bulkhead; attention is drawn to *Pt 5, Ch 10, 5.8 Construction and installation 5.8.1*. Details of the arrangements are to be submitted for approval.

5.8.8 Pipes or other fittings attached directly to the plating of tanks and to bulkheads, which are required to be of watertight construction, are to be secured by means of studs screwed through the plating or by tap bolts, and not by bolts passing through clearance holes. Alternatively, the studs or the bulkhead pieces may be welded to the plating.

~~5.8~~ 5.9 ~~Testing~~ Additional requirements for testing plastic pipes for inland waterways vessels

All content in this sub-Section has been deleted and replaced with the following.

5.9.1 Where a piping system is required to be electrically conductive, tests are to be carried out in accordance with *Pt 5, Ch 10, 5.6 Electrical conductivity.*

5.9.2 The hydraulic testing of pipes and fittings is to be in accordance with *Pt 5, Ch 10, 8 Hydraulic tests on pipes and fittings*.

5.9.3 In the case of pipes intended for essential services each qualified person is, at the place of construction, to make at least one test joint, representative of each type of joint to be used. The joined pipe section is to be tested to an internal hydrostatic pressure of four times the design pressure of the pipe system and the pressure held for not less than one hour, with no leakage or separation of joints. The bonding procedure test is to be witnessed by the Surveyor.

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